Hitachi Gigabit Router
GR2000-B Series

Quick Start Guide

GR2K-GA-0008
Rev. 1.00

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Statement on EN55022 Compliance

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Statement on Federal Communications Commission (FCC) Compliance

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Change Record

Revision No.	Date	Description	Affected Pages
1.00	August 2002	Initial Release	All

Preface

This manual presents simplified procedures for unpacking, setup and operating the GR2000-B models. Before you begin to unpack and use the GR2000-B, read the “Safety” pages at the beginning of this manual, which gives you directions necessary to handle the GR2000 safely.

Information contained in this manual is subject to change without prior notice.

Abbreviations

AAL	ATM Adaptation Layer
ABR	Available Bit Rate
AFI	Authority and Format Indicator
AIS	Alarm Indication Signal
ANSI	American National Standards Institute
ARP	Address Resolution Protocol
AS	Autonomous System
ATM	Asynchronous Transfer Mode
BECN	Backward Explicit Congestion Notification
BGP	Border Gateway Protocol
BGP4	Border Gateway Protocol 4
BGP4+	Multiprotocol Extensions for Border Gateway Protocol - version 4
BOD	Bandwidth On Demand
BPDU	Bridge Protocol Data Unit
CATV	Cable Television
CBR	Constant Bit Rate
CIDR	Classless Inter-Domain Routing
CIR	Committed Information Rate
CLLM	Consolidated Link Layer Management
CLNP	Connectionless Network Protocol
CLP	Cell Loss Priority
CRC	Cyclic Redundancy Check
CR-LDP	Constraint-Based Label Distribution Protocol
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
DA	Destination Address
DCC	Data Country Code
DCE	Data Circuit terminating Equipment
DDP	Datagram Delivery Protocol
DHCP	Dynamic Host Configuration Protocol
DLCI	Data Link Connection Identifier
DSAP	Destination Service Access Point
DSCP	Differentiate Services Code Point
DSP	Domain Specific Part

DSU	Digital Service Unit
DTE	Data Terminal Equipment
DVMRP	Distance Vector Multicast Routing Protocol
ELAN	Emulated LAN
ERP	Echo Response
ERQ	Echo Request
ES	End System
FCS	Frame Check Sequence
FDB	Filtering Data Base
FDDI	Fiber Distributed Data Interface
FEC	Forwarding Equivalence Class
FERF	Far End Receive Failure
GFR	Guaranteed Frame Rate
HDLC	High-level Data Link Control
HNA	Hitachi Network Architecture
ICMP	Internet Control Message Protocol
ICMPv5	Internet Control message protocol version6
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IETF	the Internet Engineering Task Force
IDI	Initial Domain Identifier
IGMP	Internet Groupe Management Protocol
ILMI	Interim Local Management Interface
IP	Internet Protocol
IPv4	Internet protocolversion 4
IPv6	Internet Protocol version 6
IPv6cp	Ipv6 Control Protocol
IPX	Internetwork Packet Exchange
ISO	International Organization for Standardization
ISP	Internet Service Provider
ITU-T	International Telecommunication Union - Telecommunication, Standardization Sector
JDI	Japanese Domain Identifier
LAN	Local Area Network
LAPB	Link Access Procedure Balanced Mode
LCP	Link Control Protocol
LDP	Label Distribution Protocol

LEC	LAN Emulation Client
LES	LAN Emulation Server
LIS	Logical IP Subnetwork
LLB	Local Loop Back
LLC	Logical Link Control
LQM	Link Quality Monitoring
LQR	Link Quality Report
LSP	Label Switched Path
LSR	Label Switched Router
MAC	Media Access Control
MC	Memory Card
MD5	Message Digest 5
MIB	Management Information Base
MMF	Multi Mode Fiber
MPLS	Multi-Protocol Label Switching
MRU	Maximum Receive Unit
NSAP	Network Service Access Point
MTU	Maximum Transfer Unit
NBP	Name Binding Protocol
NCP	Network Control Protocol
NDP	Neighber Discovery Protocol
NET	Network Entity Title
NetBIOS	Network Basic Input/Output System
NIF	Network Interface board
NRZ	Non-Return-to-Zero
NSAP	Network Service Access Point
OC-3c	Optical Carrier level 3 concatenation
OC-12c	Optical Carrier level 12 concatenation
OAM	Operation Administration and Management
OSI	Open Systems Interconnection
OSPF	Open Shortest Path First
OUI	Organizationally Unique Identifier
PC	Personal Computer
PDB	Permanent Data Base
PHY	PHYsical layer protocol
PID	Protocol IDentifier

PIM	Protocol Independent Multicast
PIM-DM	Protocol Independent Multicast -Dense Mode
PIM-SM	Protocol Independent Multicast -Sparse Mode
PLD	Programmable Logic Design
POS	PPP over SONET/SDH
PPP	Point-to-Point Protocol
PPS	Packet Per Second
PVC	Permanent Virtual Channel (Connection)/Permanent Virtual Circuit
QoS	Quality of Service
RA	Router Advertisment
RFC	Request For Comments
RIP	Routing Information Protocol
RIPng	Routing Information Protocol Next Generation
RLB	Remote Loop Back
RM	Routing Manager
RPF	Reverse Path Forwarding
RP	Routing Processor
RSVP	Resource Reservation Protocol
SA	Source Address
SAP	Service Access Point
SD	Start Delimiter
SDH	Synchronous Digital Hierarchy
SDLC	Service Advertising Protocol
SD-I	Super Digital I interface
SFD	Start Frame Delimiter
SMF	Single Mode Fiber
SNA	Systems Networking Architecture
SNAP	Sub-Network Access Protocol
SNMP	Simple Network Management Protocol
SONET	Synchronous Optical Network
SPT	Spanning Tree
SPX	Sequenced Packet Exchange
SSAP	Source Service Access Point
SSP	Switch to Switch Protocol
SVC	Switched Virtual Channel (Connection)

SW	Switch
TA	Terminal Adapter
TCC	Transmission Control Character
TCP/IP	Transmission Control Protocol/Internet Protocol
TOS	Type Of Service
TTC	Telecommunication Technology Committee
TTL	Time To Live
UBR	Unspecified Bit Rate
UDP	User Datagram Protocol
UNI	User Network Interface
VBR	Variable Bit Rate
VC	Virtual Channel/Virtual Call
VCI	Virtual Channel Identifier
VP	Virtual Path
VPI	Virtual Path Identifier
WAN	Wide Area Network
WS	Work Station
WWW	World-Wide Web
xDSL	x Digital Subscriber Line

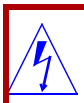
Safety Guide

This document provides safety-related notices for use of the GR2000 Gigabit Router. Read the following Safety Guidelines carefully before using the product and follow them to take full advantage of the GR2000's features.

General Safety Guidelines

- Perform all operations in accordance with the instructions and procedures as described in the product manuals.
- Be alert and use common sense. The hazard warnings cannot cover every possible situation. Do not perform any operations not described in the documentation. In the event of a problem, turn off the power, unplug the power cable, and contact a qualified service technician.
- Follow all precautionary and hazard messages on the GR2000 and in the documentation. Failure to do so may result in bodily injury, damage to the device, or an interruption in service.
- The hazard warnings on the machine or in the manual have the following headings and symbols, CAUTION or WARNING. Hazard warnings on the device and in the manuals are provided to prevent or reduce risk of death, personal injury, or product damage. Understand and follow these hazard warnings:

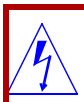
Caution: **This is a caution notice. Follow the instructions in this notice to avoid damage to the equipment or a disruption in service.**



DANGER: **This is a warning notice. Follow the instructions in this notice to avoid the possibility of bodily injury occurring.**

The following sections have specific instructions regarding warnings and cautions.

Specific Warning Instructions



DANGER: Failure to follow the instructions in this section could cause bodily injury or death to the user.

- Do not operate the device if you suspect damage or failure.
- Do not use the device if there is smoke or an unusual smell coming from the system. If either occurs, immediately turn power off and unplug the power cable from the outlet. Contact a qualified service technician.
- In the case of the GR2000-20H, GR2000-10H, or GR2000-6H with DC power supplies installed, turn off the circuit breaker on the power facility supply side.
- If the device is installed in a rack, unplug the device power cable from the rack outlet. If the component with the problem cannot be identified, remove all power cables from the rack outlet. Contact a qualified service technician.
- In the case of redundant power supplies, make sure that ALL switches and circuit breakers are turned off.
- If the device is dropped and any part is broken, turn the power switch off, unplug the power cable from the outlet, and contact service. Continued use may cause fire or electric shock.
- Do not use any unspecified power source or power voltage. Observe all terminal ratings and markings on the product.
- To prevent electric shock, use only grounded power outlets when using AC power. Do not overload power outlets. In the case of DC power or the GR2000-20H, use a ground wire to prevent electric shock.
- Do not use adapters to connect multiple power cables to the same outlet. Use standard safety procedures with the power cable.
- Use only the power cable supplied with the device. Use of other cables may cause fire or electric shock. Keep the power cable away from extreme heat.
- Similarly, do not use the provided power cable for products other than the GR2000, since this could cause a fire or electrical shock hazard.
- Do not operate the device in wet or damp conditions
- If liquid is spilled on the device, turn power off and unplug the power cable from the outlet. Discontinue use to avoid the risk of fire or electric shock.
- Place device on a stable, level surface. Do not place or stack objects on top of the device.
- If a foreign object falls into the device, turn power off and unplug the power cable from the outlet. Do not attempt to remove the object while the power is on.
- Do not remove the device's cover while the device is in operation.
- Touching internal parts may cause electric shock. Contact a qualified service technician for any internal inspection, adjustment or repair. Do not modify the device. Doing so may cause fire or electric shock.
- Do not insert any foreign objects into the device or the ventilation slots. Doing so may cause fire or electric shock.
- Do not insert hands or any other object into a fan.
- Do not allow unauthorized users of the device to pull out boards or power supplies at any time.
- Do not set the GR2000 in a dusty or humid location. Doing so may cause fire or electric shock.

- This router contains a lithium battery for the real-time clock. Mishandling this battery may cause heat build-up, damage, or in an extreme case, explosion or fire.
  - Do not remove the battery from the device, disassemble it, or expose it to temperatures of over 100°C (212°F)
  - Do not throw or immerse lithium batteries into water.
  - Dispose of exhausted batteries as required by local regulations.
- Remove dust on and around the device regularly. Dust buildup can cause fire or electrical shock, and can result in failure of the device.
- The power supply of the GR2000-6H weighs 8 kg. Handle with care, since it could cause injury if it is dropped.

Specific Caution Instructions

Caution: **This is a caution notice. Follow the instructions in this notice to avoid damage to the equipment or a disruption in service.**

- Condensation may form on the surface and inside the device if it is moved from a cold to a warm location. Using the device in this condition may cause fire or electric shock. After moving the device between two locations with a large temperature variation, let the device stand for a few hours before using.
- Do not block the device's ventilation.
- Move the device carefully. Before moving the device, unplug the power cable, disconnect all exterior devices, and remove the stabilization clamps. Failure to follow this warning may damage the device or power cable, causing fire or electric shock.
- Do not hold the device by the front and back when moving; the cover may come off, causing the device to fall.
- Do not subject the device to extreme temperatures.
- Do not place the device in direct sunlight or near heat sources that may cause damage.
- A yellow label designates that a Class 1 laser is being used. Light emission is minimal and not hazardous, but avoid looking directly into the laser beam.
- Approximate weights of the GR2000 models are as follows:
  - GR2000-1B: Approx. 6 kg. (13.2 lbs.)
  - GR2000-2B: Approx. 7 kg. (15.4 lbs.)
  - GR2000-2S: Approx. 15 kg. (33 lbs.)
  - GR2000-4S: Approx. 21 kg. (46 lbs.)
  - GR2000-6H: Approx. 55 kg. (121 lbs.)
  - GR2000-10H: Approx. 120 kg. (264 lbs.)
  - GR2000-20H: Approx. 160 kg. (352 lbs.)

Other Instructions

Cleaning

- Clean the device only with a clean, dry cloth or use a cloth that has been dampened with water or another pH-neutral liquid and thoroughly wrung out.
- Do not use volatile organic solutions such as benzene or paint thinner, chemicals, chemically treated cloths or pesticides, which may deform, discolor or damage the device.

Storage

Unplug the power cable from the outlet when the device is not used for long periods.

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Chapter 1
Introduction

We deeply appreciate your purchasing a HITACHI Gigabit Router GR2000-B models.

This manual presents simplified procedures for unpacking, setup and operating the GR2000-B models. Before you begin to unpack and use the GR2000-B, read the "Safety" pages at the beginning of this manual, which gives you directions necessary to handle the GR2000 safely.

The chapters following this one cover subjects of most interest to new customers:

- Chapter 2 explains briefly about the process of unpacking the GR2000-B models and setting them up.
- Chapter 3, explains briefly about the operations of the GR2000-B models, such as those for logging in, setting the time/configurations, or excuting operational commands.
- Chapter 4 gives information about the troubleshooting communication problems or an apparently malfunctioning GR2000-B.

1.1 Documents about the GR2000-B models

This manual guides you on how to operate the GR2000-B models from unpacking them to inputting the basic commands. Mind that the information given here is the minimum knowledge necessary to start up the GR2000-B models. For the detailed information about the GR2000-B, see the following manuals:

- *Hitachi Gigabit Router GR2000-B Series Installation Guide*
- *Hitachi Gigabit Router GR2000 Series Enhanced Version Applications Guide*
- *Hitachi Gigabit Router GR2000 Series Enhanced Version Configuration Guide*
- *Hitachi Gigabit Router GR2000 Series Enhanced Version Operations Guide*

The manuals and their subjects are shown in Figure 1-1 below.

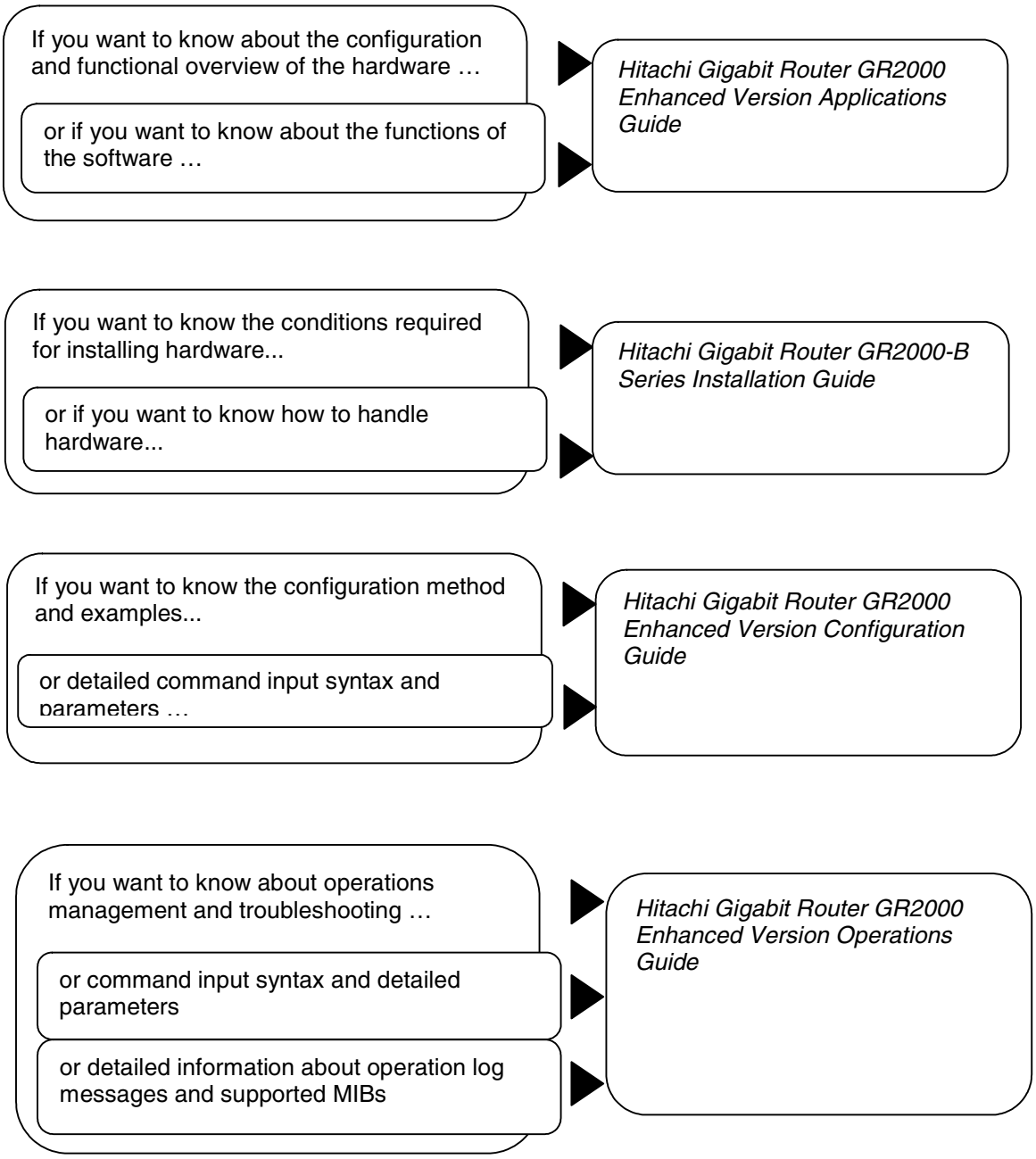
If you want to know about the configuration and functional overview of the hardware …
or if you want to know about the functions of the software …
Hitachi Gigabit Router GR2000 Enhanced Version Applications Guide
If you want to know the conditions required for installing hardware...
or if you want to know how to handle hardware...
Hitachi Gigabit Router GR2000-B Series Installation Guide
If you want to know the configuration method and examples...
or detailed command input syntax and parameters …
Hitachi Gigabit Router GR2000 Enhanced Version Configuration Guide
If you want to know about operations management and troubleshooting …
or command input syntax and detailed parameters
or detailed information about operation log messages and supported MIBs
Hitachi Gigabit Router GR2000 Enhanced Version Operations Guide

Figure 1-1 Documentation for the GR2000-B Series

Chapter 2
Setup Process

This chapter explains briefly about the whole process from unpacking a product package to powering up the GR2000-B.

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2.1 Check that All Necessary Components are Present

Before you unpack the GR2000-B, find the packing list and check the contents of the box against the list. Make sure that all components are present before you begin the setup process.

2.2 Assemble the Required Tools for Setup.

Make sure you have the following tools before you begin setup. The only tools required to install and set up a GR2000-B router are:

- A #2 Phillips screwdriver for attaching the GR2000-B to a rack
- A medium-sized flat-blade screwdriver for attaching cables.

2.3 Setting Up the GR2000-B

2.3.1 The GR2000-1B

The GR2000-1B has the following hardware features:

- Two built-in Ethernet ports 10BASE-T/100BASE-TX,
- One slot for a network interface board, and
- Two MC (memory card) slots.

Figures 2-1 and 2-2 show the front and rear views of the GR2000-1B, respectively.

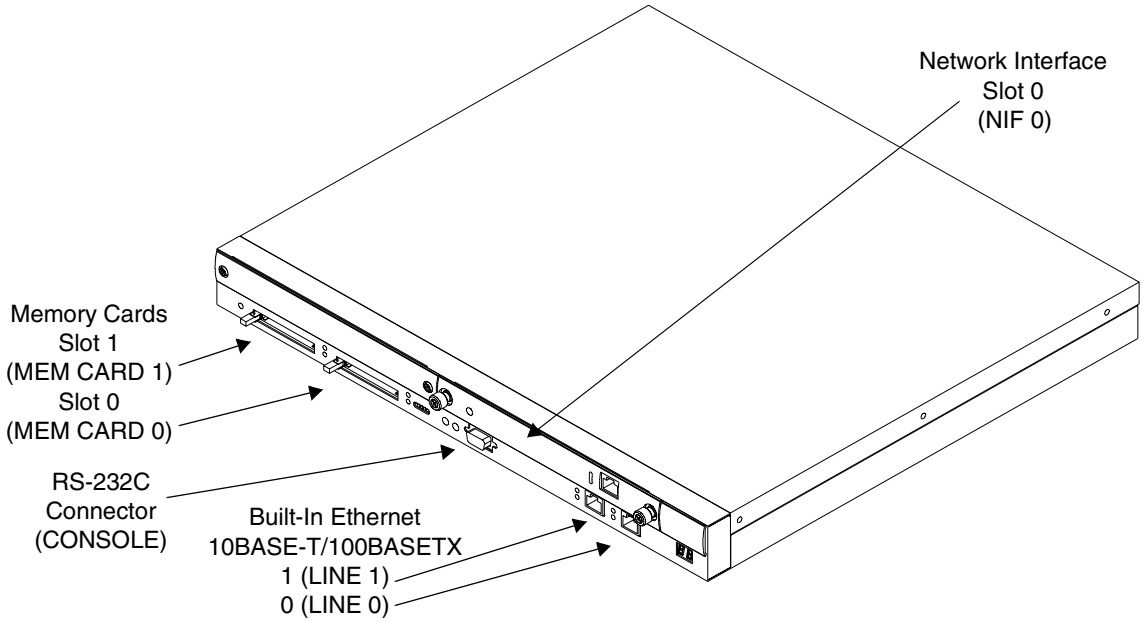


Figure 2-1 GR2000-1B Front View

Note: For the details about connectors, indicators, and switches, see the *GR2000-B Installation Guide*.

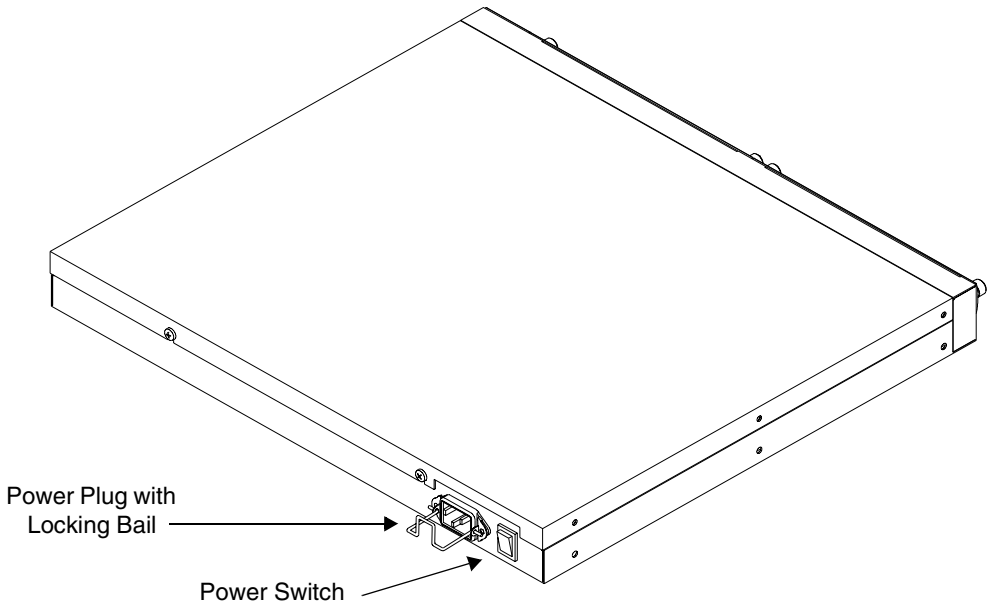


Figure 2-2 GR2000-1B Rear View

2.3.2 GR2000-2B

The GR2000-2B has the following hardware features.

- Four built-in Ethernet ports 10BASE-T/100BASE-TX,
- Two slot for network interface boards, and
- Two MC (Memory Card) slots.

Figure 2-3 shows the front view of the GR2000-2B with both option slots filled. Figure 2-4 show the rear view of the GR2000-2B.

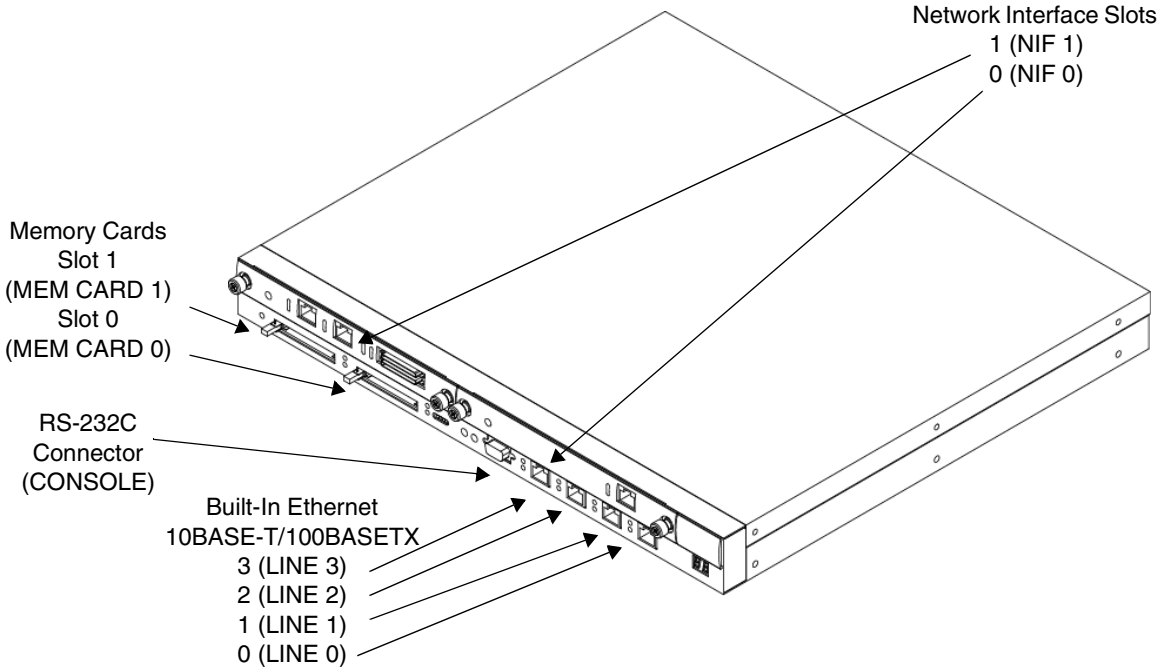


Figure 2-3 GR2000-2B Front View

Note: For the details about connectors, indicators, and switches, see the *GR2000-B Installation Guide*.

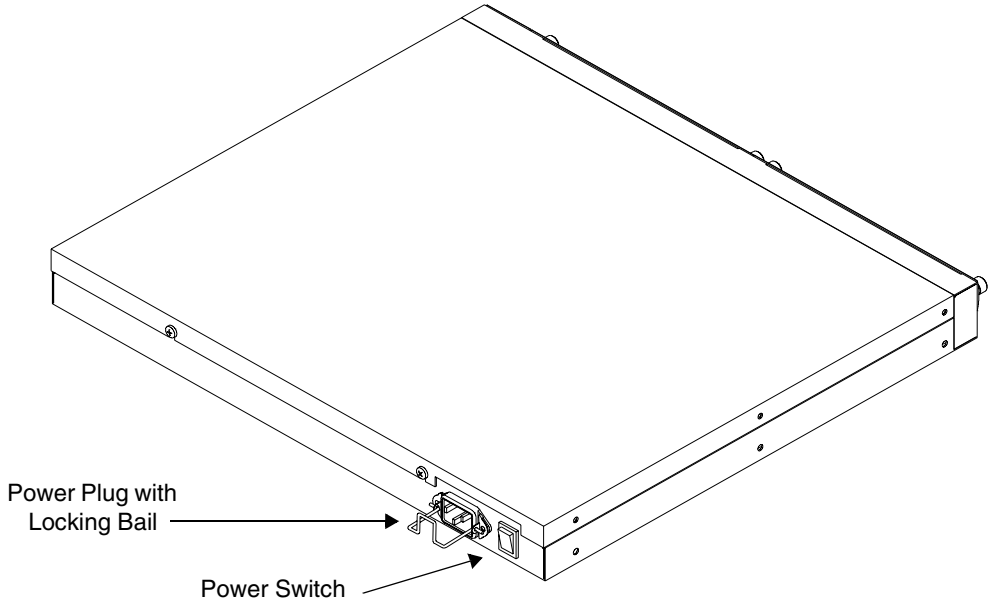
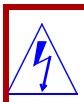


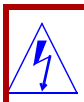
Figure 2-4 GR2000-2B Rear View

2.4 Dangers, Cautions, and Notes Regarding Setup

Below are collected some important messages regarding installation of the GR2000-B router.



DANGER: Do not put the router on an unstable or uneven surface. Instead, always place the router on a stable, flat surface to prevent it from falling and causing a physical damage to equpment or those near the unit.



DANGER: When installing the router on a desk, lay it down horizontally. If you stand it vertically or lean it against a wall, it can easily fall down and cause a damage to yourself and the router.

Caution: Do not block the ventilation slots on the sides of the router. If you block the ventilation slots, the inside of the router will overheat up and malfunction or even cause a fire. Secure a space of 70mm from around the ventilation slots.

Do not put objects weighing more than 5 kg (11 lbs.) on the router. Otherwise, you can damage the router, or cause it to fall.

Caution: When working around the router, wear a wrist strap to prevent static electricity discharge. Without a wrist strap, the GR2000-B might be damaged due to static electricity.

Note: Place the GR2000-B in a position where you can easily check the condition of the front panel indicators.

- Protect cables by running them through a duct or by using a braid. Especially for optical fiber cables, a cord bend radius of at least 100 mm in length and 50 mm in breadth and a metal braid are necessary to protect them.
- For optical fiber cables, leave a 3 m length of cable for maintenance. Wind the rest of the cable and store it near the GR2000-B. If an optical fiber cable and other types of interface cables coexist, do not stress the optical fiber cable, since it can break.

2.5 Installing the GR2000-B on a Table or Desk

You can install the GR2000-B on a stable and flat table or desk. Install the router according to the following procedures. If you want to install a GR2000-B in a rack, see the *GR2000-B Installation Guide*.

Note: Do not attach the rubber stoppers to the router when installing it into a rack.

1. Place the router upside down on a flat, clean surface.
2. As shown in Figure 2-5, attach the rubber feet to the 1.5 mm holes (4 holes in all).

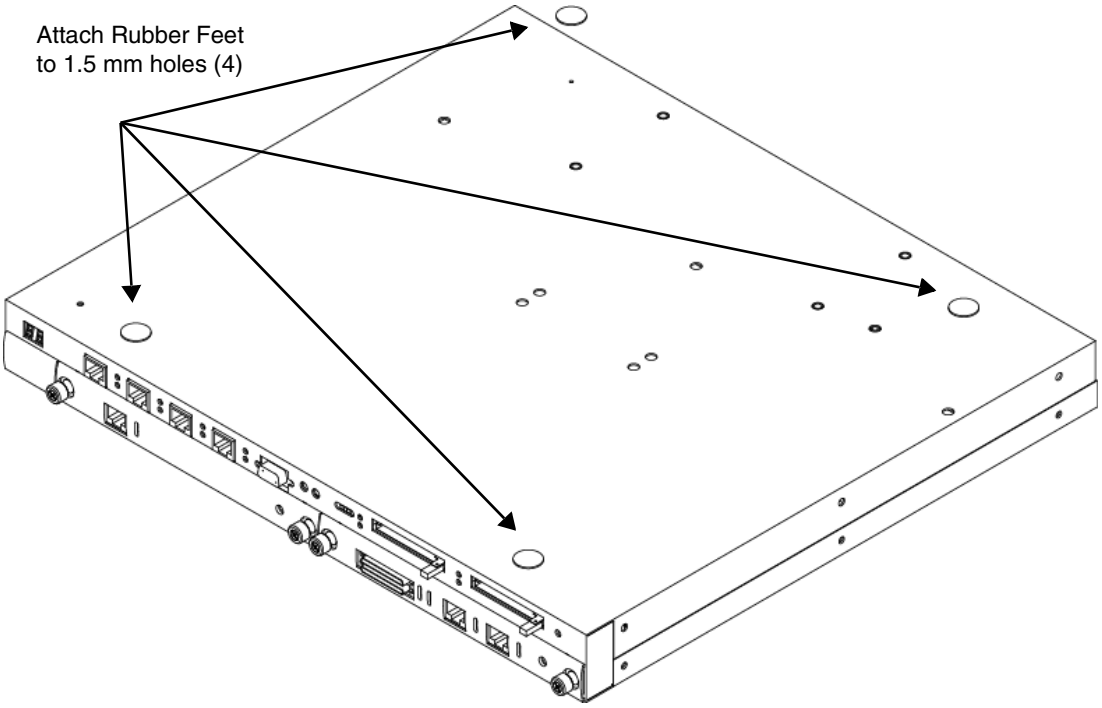


Figure 2-5 Attaching the Rubber Feet

3. Turn over the router and install it on a desk.

2.6 Attaching and Detaching the Power Cable

DANGER: To prevent the possibility of electric shock, use only grounded power outlets.

1. As shown in Figure 2-6, attach the power cable to the connector at the back of the GR2000-B.

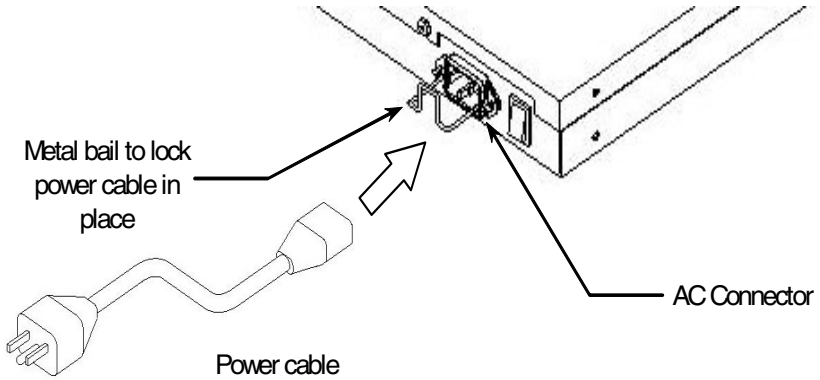


Figure 2-6 Connecting a Power Cable to the GR2000-B

2. As shown in Figure 2-7, lock the power cable connector into place on the GR2000-B chassis.

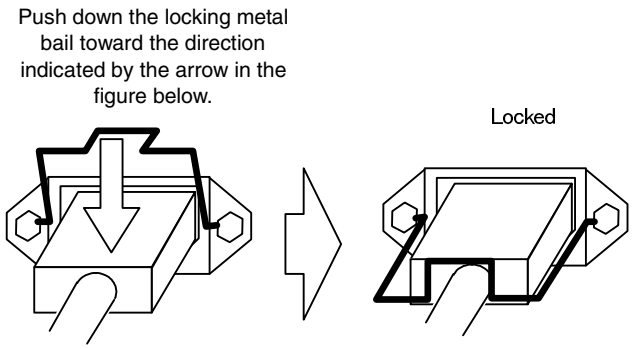


Figure 2-7 Locking the Power Cable into Place

Note: When pulling a cable out of the connector, follow the procedures above in reverse order.

1. As shown in Figure 2-7, make sure that the power switch is depressed in the OFF (0) position and plug the other end of the cable into the AC outlet you plan to use.

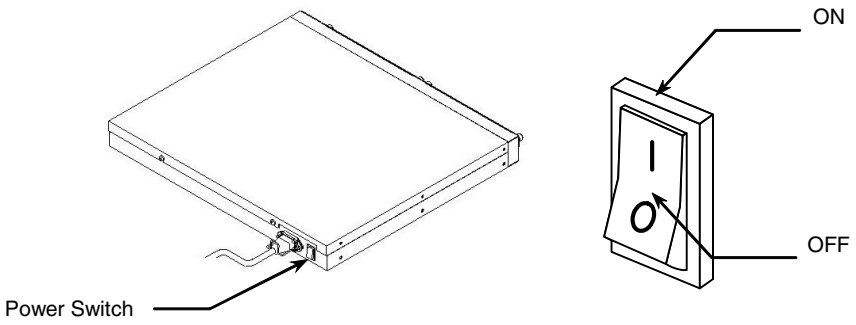


Figure 2-8 Location of Power Switch

2.7 Installing a Memory Card

This procedure shows the process for installing and removing a memory card from memory card slot 0. The operations for the memory card slot 1 are same as those for the memory card slot 0.

(1) Installing a Memory Card

1. Insert a memory card in the position shown in Figure 2-9 and Figure 2-10 below. When successfully inserted the lever next to the slot will be pushed forward.

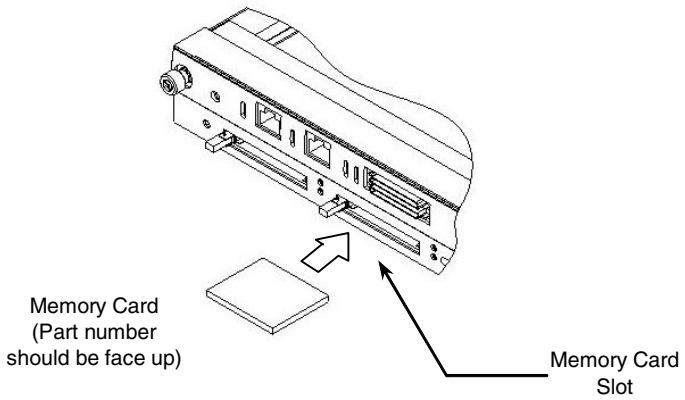


Figure 2-9 Installation of a Memory Card

Note: When inserting a memory card, the surface labeled with the part number "HN-F9531-MC64X (BMC64)" should be face up.

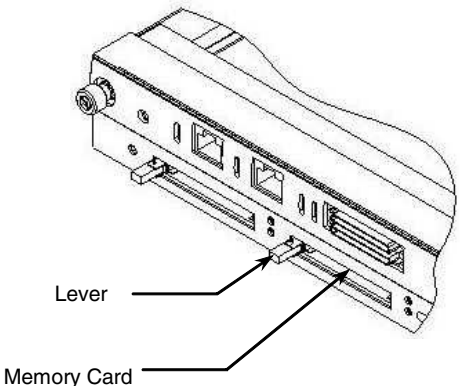


Figure 2-10 After Installation of a Memory Card

2. Move the lever into the direction indicated by the arrow in Figure 2-11 below to lock the memory card into place.

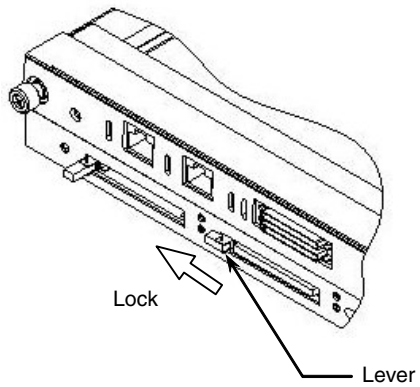


Figure 2-11 Locking a Memory Card

(2) Pulling Out a Memory Card

1. Move the lever in the direction indicated by the arrow in Figure 2-12 below to unlock the memory card.

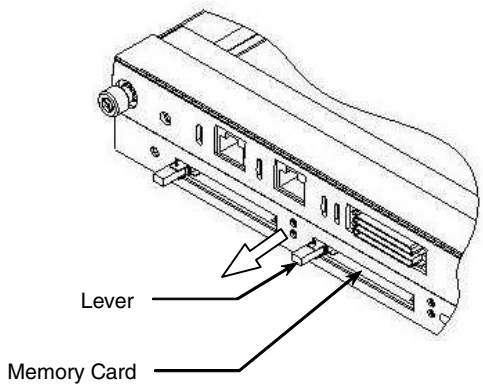


Figure 2-12 Unlocking a Memory Card

2. Push the lever toward the direction indicated by the arrow as shown in Figure 2-13 below.

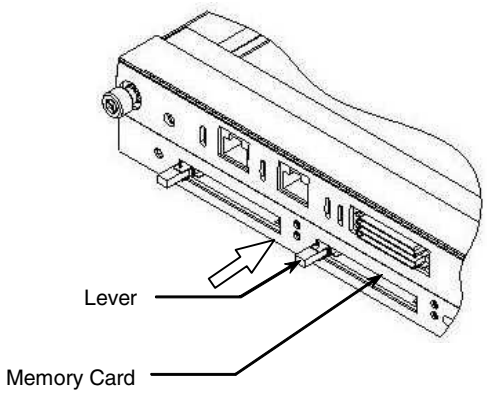


Figure 2-13 Removing a Memory Card

3. Pull out the memory card as shown in Figure 2-14 below.

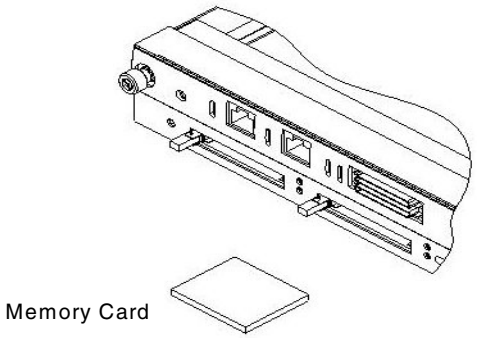


Figure 2-14 Memory Card Removed.

Caution: While the access indicator (ACCESS) for a memory card is lit, the memory card is being accessed. DO NOT pull out a memory card or turn off the power switch while the memory card is being accessed. If so, you could permanently damage the memory card.

Some commands require a long time to finish accessing a memory card when they are executed. Make sure that the access to a memory card is finished before pulling it out or turning off the power switch.

2.8 Software

Software is preinstalled on the memory card when the GR2000-B is shipped. Refer to the *GR2000 Applications Guide* for procedures for re-installing software onto a memory card.

2.9 The Setup Terminal and Cable Connections

A personal computer or terminal is used to connect to the CONSOLE port on the GR2000-B to perform initial setup.

2.9.1 Setup Terminal

Prepare a personal computer or a workstation which supports the following features mentioned in Table 2-1 below.

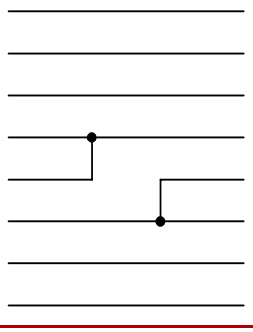
Table 2-1 Specifications Required for Setup Terminals

Category		Specification
Communication port		RS−232C
Communication software		Hyperterminal utility in Windows 95/98 or other similar terminal communication software.
Communication settings	Transfer Protocol	ZMODEM
	Parameter	8-bits data, 1 stop bit, no parity
	Speed in bps (Note)	19200, 9600, 4800, 2400, or 1200
Other features		CD−ROM drive
Note: Set to default of 9600 bit/s as shipped from factory.		

2.9.2 Connecting Cable

The RS−232C cable, a cross-cable having a D−sub 9-pin (female) on each end, is required to connect GR2000-B to a setup terminal. Table 2-2 below shows the pin arrangement of the RS-232C cable.

Table 2-2 Pinout for RS-232C Cable

No.	Router Side: 9 Pins (Female)		Physical Connection	Console Side: 9 Pins (Female)	
	Pin Number	Signal Name		Pin Number	Signal Name
1	5	SG		5	GND
2	3	SD		2	RX
3	2	RD		3	TX
4	7	RS		1	DCD
5	8	CS		8	CTS
6	1	CD		7	RTS
7	6	DR		4	DTR
8	4	ER		6	DSR

2.9.3 Connecting a Setup Terminal to the GR2000-B

The RS-232C cable, across cable having the D-sub 9-pin (female) on each end, is required to connect the GR2000-B to a setup terminal. Connect the RS-232C cable to the setup terminal in the same way as shown in Figure 2-15 below.

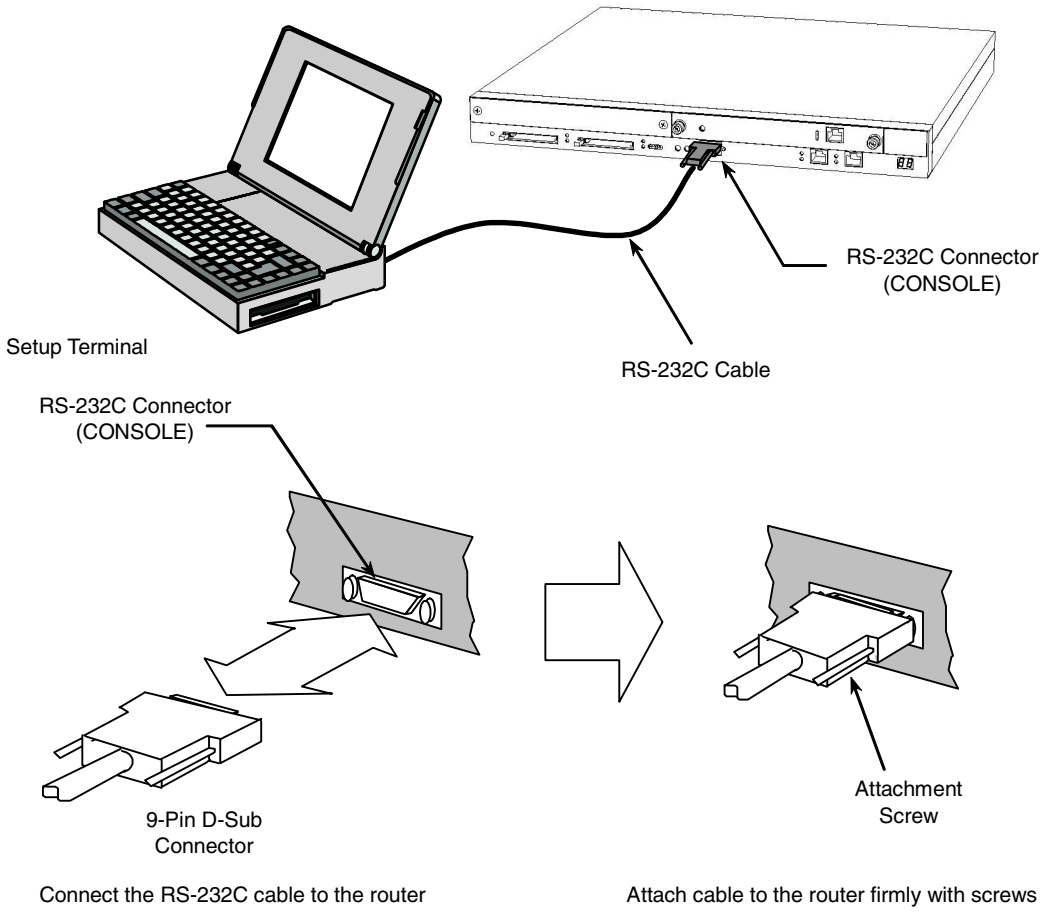


Figure 2-15 Connecting a Setup Terminal to the GR2000-B

2.9.4 Connecting the GR2000-B to Other Devices

Connect the GR2000-B to other devices by using interface cables. See the Figure 4-1 as an example.

Note: The required type of cables differs depending on an interface you use. For cable specificationa and characteristics, see the *GR2000-B Installation Guide*.

2.9.5 Turning the Power Switch ON

The power switch for the GR2000-B is a rocker switch located next to the power cord on rear panel. Operate the switch to turn power ON (1) or OFF (0). Turn on the power at the back of the GR2000-B.

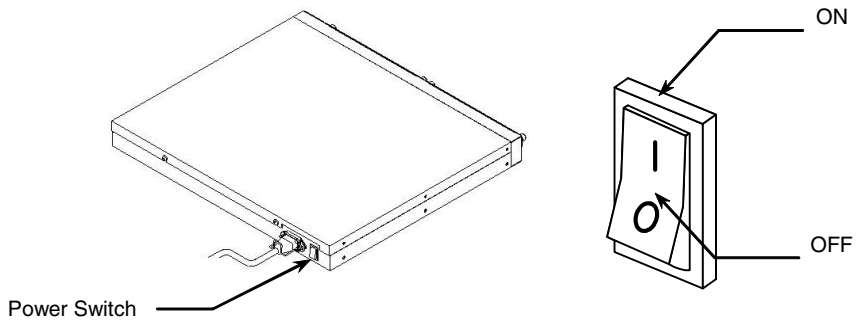


Figure 2-16 Switching Power ON and OFF

2.10 Normal Start-Up Process for the GR2000-B

Below is the process from powering on the device to starting it.

1. The STATUS RMP indicator starts blinking green as soon as the system is powered ON.
2. The GR2000-B begins loading it's software when the ACC (access) indicator lights in green. During this time, the STATUS RMP indicator continues to blink.
3. The STATUS RMP indicator lights solid green after the software has loaded. The system then starts up normally.

Note: The STATUS RMP or STATUS ETHERNET indicator showing red indicates trouble. For details, see the *Hitachi Gigabit Router GR2000 Series Enhanced Version Operations Guide.*

Caution: If a memory card is not installed, the GR2000-B stops running while showing "20" in the STATUS CODE display. Power off the GR2000-B and install a memory card, then power it on again.

2.10.1 Turning the Power OFF

Turn the power switch at the back of the GR2000-B to OFF (0)

Caution: While the access indicator (ACCESS) for a memory card is lit, the memory card is being accessed. DO NOT pull out a memory card or turn off the power switch while the memory card is being accessed. If so, you could permanently damage the memory card.

Some commands require a long time to finish accessing a memory card when they are executed. Make sure that the access to a memory card is finished before pulling it out or turning off the power switch.

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Chapter 3
Basic Operations

This chapter shows examples of the commands required for connecting the GR2000-B to other devices. The chapter contains the following sections:

- Configuration examples
- Startup of the GR2000-B
- Configuration setting
- Display of the operation status
- Details about the commands introduced in this chapter
- More details about the operation

3.1 Configuration Examples

Using the example below, this section explains about the simple method of setting configurations.

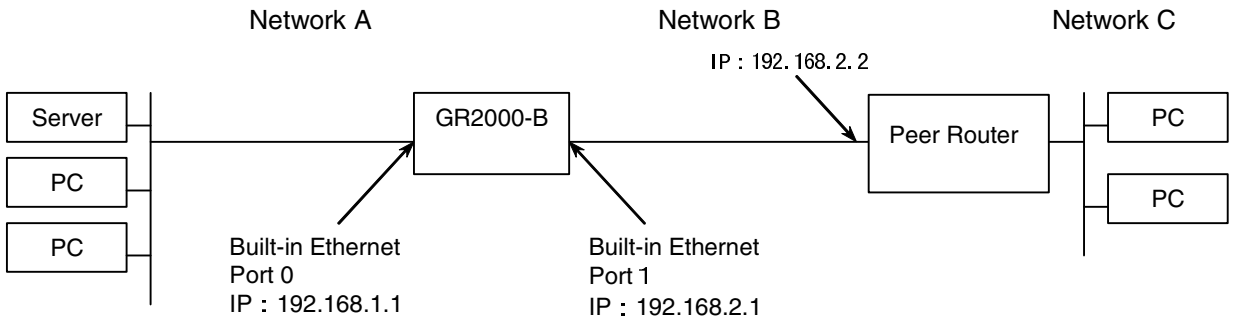


Figure 3-1 Example of a GR2000-B Connecting to Other Devices

To construct the configuration above in Figure 3-1, set the GR2000-B according to the following instructions:

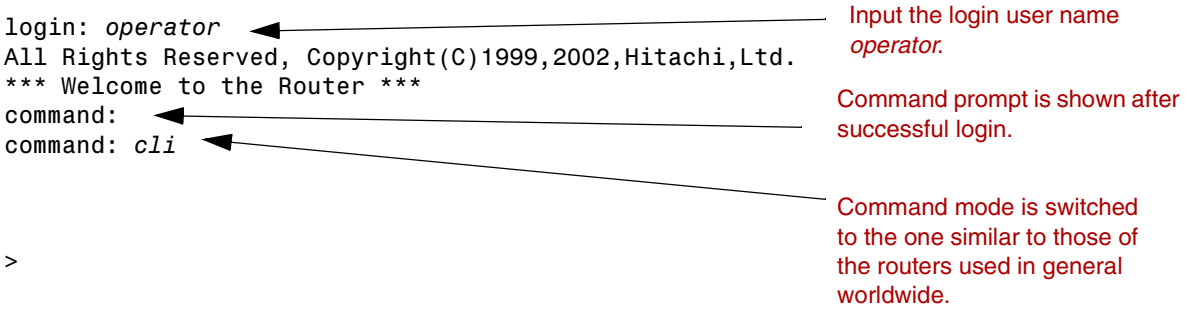
- Set IP address "192.168.1.1" for PORT 0 of the GR2000-B built-in Ethernet.
- Set IP address "192.168.2.1" for PORT 1 of the GR2000-B built-in Ethernet.
- Set IP address "192.168.2.2" for a default route (in case that the IP address "192.168.2.2" is set for the port of the peer router.)

3.2 Startup of the GR2000-B

This section explains about how to start the GR2000-B, login from the setup terminal, and set the time.

3.2.1 First-Time Login

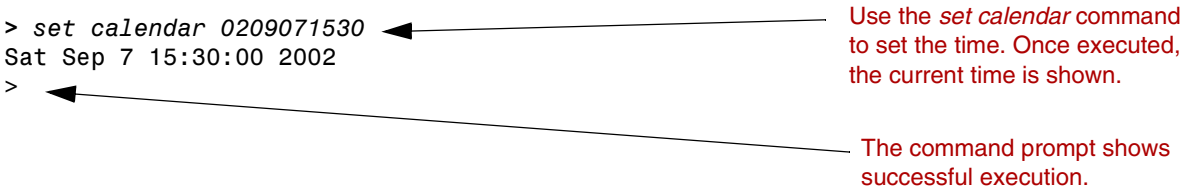
The default login user name is *operator*. The default passoword is not set. The command prompt (>) is shown when you login successfully.


login: operator
All Rights Reserved, Copyright(C)1999,2002,Hitachi,Ltd.
*** Welcome to the Router ***
command:
command: cli
>
Input the login user name operator.
Command prompt is shown after successful login.
Command mode is switched to the one similar to those of the routers used in general worldwide.

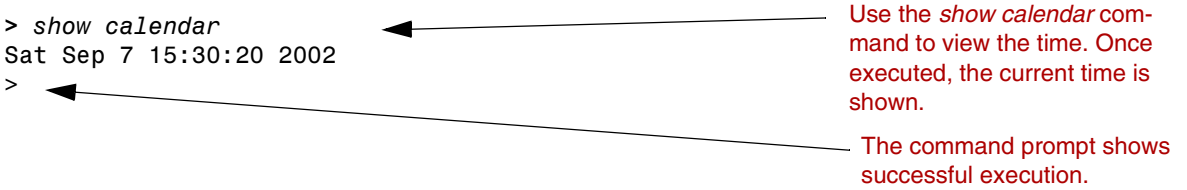
Note: We strongly recommend that you set a password to secure the router. You can set a password with *passwd* command.

3.2.2 Setting the Time

You must set the current time the first time you log in. For example, here is how to set the time to "Sep 7 15:30:00 2002:"

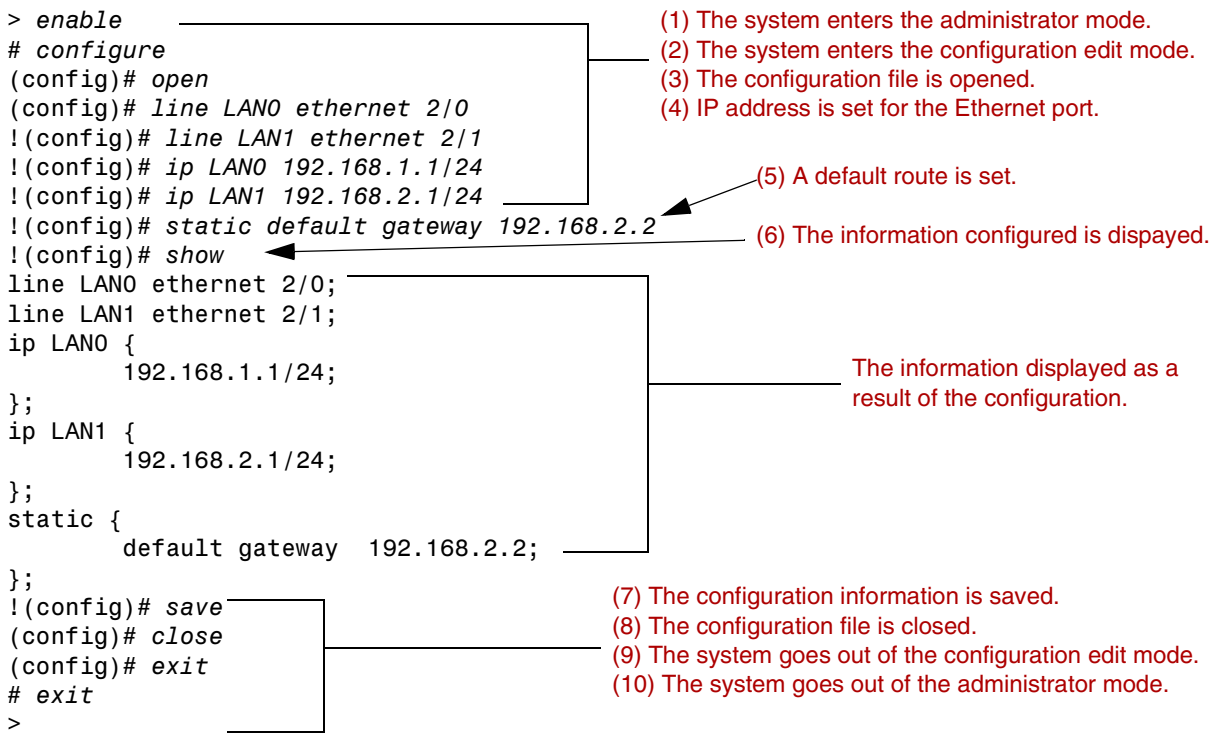

> set calendar 0209071530
Sat Sep 7 15:30:00 2002
>
Use the set calendar command to set the time. Once executed, the current time is shown.
The command prompt shows successful execution.

For showing the current time use the show calendar command:


> show calendar
Sat Sep 7 15:30:20 2002
>
Use the show calendar command to view the time. Once executed, the current time is shown.
The command prompt shows successful execution.

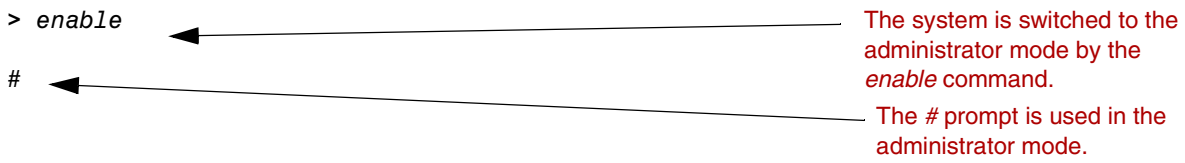
3.3 Setting the Configuration

This section explains about how to configure the GR2000-B for operation.

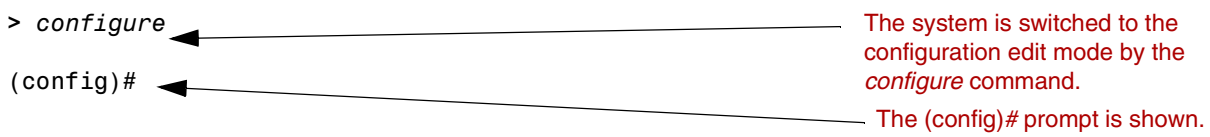

> enable
configure
(config)# open
(config)# line LAN0 ethernet 2/0
!(config)# line LAN1 ethernet 2/1
!(config)# ip LAN0 192.168.1.1/24
!(config)# ip LAN1 192.168.2.1/24
!(config)# static default gateway 192.168.2.2
!(config)# show
line LAN0 ethernet 2/0;
line LAN1 ethernet 2/1;
ip LAN0 {
192.168.1.1/24;
};
ip LAN1 {
192.168.2.1/24;
};
static {
default gateway 192.168.2.2;
};
!(config)# save
(config)# close
(config)# exit
exit
>
(1) The system enters the administrator mode.
(2) The system enters the configuration edit mode.
(3) The configuration file is opened.
(4) IP address is set for the Ethernet port.
(5) A default route is set.
(6) The information configured is dispayed.
The information displayed as a result of the configuration.
(7) The configuration information is saved.
(8) The configuration file is closed.
(9) The system goes out of the configuration edit mode.
(10) The system goes out of the administrator mode.

Here is some detailed information about the each of the settings.

3.3.1 Enter the Administrator Mode


> enable
#
The system is switched to the administrator mode by the *enable* command.
The # prompt is used in the administrator mode.

3.3.2 Enter the Configuration Edit Mode (Begin Editing the Configuration)


> configure
(config)#
The system is switched to the configuration edit mode by the *configure* command.
The (config)# prompt is shown.

3.3.3 Open the Configuration File

```
(config)# open
(config)#
```

The configuration file is opened by the *open* command.

The operative configuration file in memory is opened in case that the file name was omitted.

Note: This is the example for the case where the operative configuration file in memory is opened. You can open any designated prepared configuration file by inputting the file name.

3.3.4 Set an IP Address for the Ethernet Port

```
(config)# line LAN0 ethernet 2/0
!(config)# line LAN1 ethernet 2/1
!(config)# ip LAN0 192.168.1.1/24
!(config)# ip LAN1 192.168.2.1/24
```

Set built-in Ethernet Port 0 of as “LAN0” with the *line* command. The "2/0" means that the NIF number is "2" and the port number is "0" (the built-in Ethernet is commensurate with the NIF number "2”).

Likewise, set built-in Ethernet port 1 as "LAN1." The prompt *!* is shown after the configuration changes.

Set an IP address and the subnet mask length for "LAN0" with the *ip* command. For this example, the IP address is "192.168.1.1" and the subnet mask length is "24."

Likewise, set the IP address to "192.168.2.1" and the subnet mask length to "24" for "LAN1."

3.3.5 Set a Default Route

```
!(config)# static default gateway 192.168.2.2
```

A static route is set using the *static* command. In this example, the address "192.168.2.2" is set as a default route.

3.3.6 Check the Configuration You Set by Displaying its Information

Note: Although you can skip this operation, check if the configuration information edited is correct to avoid the trouble at the time the GR2000-B starts running.

For the display style, refer the examples of each command execution.

```
!(config)# show
line LAN0 ethernet 2/0;
line LAN1 ethernet 2/1;
ip LAN0 {
        192.168.1.1/24;
};
ip LAN1 {
        192.168.2.1/24;
};
static {
        default gateway  192.168.2.2;
};
!(config)#
```

The configuration information is displayed by the show command.

The information displayed as a result.

The "(config)#" prompt is shown after the information is displayed.

3.3.7 Save the Configuration Information Into the Configuration File

```
!(config)# save
(config)#
```

The edited configuration information is saved into the configuration file you are working on using the save command.
The *!* prompt is deleted after the configuration information is saved.

Note: The configuration information is saved into the file currently opened in case that you skip inputting a file name. Therefore, in this example, the information is saved into the operative configuration file on memory. You can save the information into any preparative configuration file designated by inputting a file name.

3.3.8 Close the Configuration File

```
(config)# close
(config)#
```

The configuration file being edited is closed by the *close* command.

3.3.9 Return to the Administrator Mode

```
(config)# exit
```

The edit is finished using the *exit* command, and the system returns to the administrator mode (*#* prompt).

3.3.10 Exit the Configuration Edit Mode (Finish Editing the Configuration)

```
# exit
```

The system exits the administrator mode with the *exit* command.

Note:	**For the details about each command introduced in this guide, see the following manuals of the GR2000.**		
	passwd	*GR2000 Operations Guide*	User Administration
	date		Device Information
	admin		User Administration
	config	*GR2000 Configuration Guide*	Configuration Commands
	open		Configuration Subcommand
	line		Line Information
	ip		IP Information
	static		IP Routing Protocol Information
	save		Configuration Subcommand
	show		Configuration Subcommand
	close		Configuration Subcommand
	exit		Configuration Subcommand

3.4 Display of Operation Status

3.4.1 Display of the Operation Status Covering the Entire Router

```
> show router
2002/09/02 15:42:09
router: GR2000-2B, S-9181-6B 06-04 [ROUTE-OS6B]
node  : name=
        contact=
        locate=
     node info: simplex mode
     tunnel optimize: off
     ipv4 routing entry: current number=7 , max number=100000
     ipv6 routing entry: current number=7 , max number=6000
     main fan : active no=MFAN0, MFAN1, MFAN2
     power fan : active no=PFAN0
     power0 : active
     STATUS(RMP) LED : green
   rm0 : active
     rm   : INTERNAL 0000
     boot : 02/28 13:54:36 , power on , 0 times restart
     lamp : READY LED=green ,
            ALARM LED=light off , ERROR LED=light off , STATUS CODE=light off
     board: CPU=Intel Celeron 566MHz , memory=131,072KB(128MB)
     temperature : RM-CPU board=normal(31degree)
     MC0  : primary slot , mc-enabled
            unknown , GR2000 format ,
            29,542KB used (user Area: 29,542KB , dump Area: 0KB)
            27,418KB free (user Area: 21,316KB , dump Area: 6,102KB)
            56,960KB total(user Area: 50,858KB , dump Area: 6,102KB)
     MC1  : secondary slot , mc-disconnect
   rp0   :active INTERNAL
     memory : size = 131,072KB(128MB),17,408KB(17.0MB) used
              Fixed area used = 13,312KB(13.0MB)
              WAN used = 0KB(0.0MB)
              Ether used = 1,024KB(1.0MB)
              ATM used = 0KB(0.0MB)
              IP(unicast) used = 1,024KB(1.0MB)
              IP(multicast) used = 1,024KB(1.0MB)
              IPv6(unicast) used = 512KB(0.5MB)
              IPv6(multicast) used = 512KB(0.5MB)
>
```

3.4.2 Display of the Operation Status of the Built-In Ethernet

```
> show nif 2
2002/09/02 15:42:51
NIF2: active  4-port 10BASE-T/100BASE-TX  retry:0
        Average:0/800Mbps  Peak:2Mbps at 15:41:16
Line0: active up  100BASE-TX full(auto)  00:00:87:a8:c5:44
        Average out:0Mbps  Average in:0Mbps
Line1: active up  100BASE-TX full(auto)  00:00:87:a8:c5:45
        Average out:0Mbps  Average in:0Mbps
Line2: unused  -  00:00:87:a8:c5:46
        Average out:0Mbps  Average in:0Mbps
Line3: unused  -  00:00:87:a8:c5:47
        Average out:0Mbps  Average in:0Mbps
>
```

The slot number for the built-in Ethernet is “2.”

3.4.3 Display of the Operation Status of the Interface Configured

```
> show ip interface
LAN0: flags=80e3<UP,BROADCAST,NOTRAILERS,RUNNING,NOARP,MULTICAST>
        mtu 1500
        inet 192.168.1.1/24 broadcast 192.168.1.255
        NIF2/Line0: UP media 100BASE-TX full(auto) 00:00:87:a8:c5:44
        Time-since-last-status-change: 00:01:55
        Last down at: -----
LAN1: flags=80e3<UP,BROADCAST,NOTRAILERS,RUNNING,NOARP,MULTICAST>
        mtu 1500
        inet 192.168.2.1/24 broadcast 192.168.2.255
        NIF2/Line1: UP media 100BASE-TX full(auto) 00:00:87:a8:c5:45
        Time-since-last-status-change: 00:01:50
        Last down at: -----
>
```

3.4.4 Display of the Routing Table

```
> show ip route
Total: 7 routes
Destination        Next Hop        Interface      Metric   Protocol  Age
0.0.0.0/0          192.168.2.2     LAN1           0/0      Static     2m  8s
127/8              ----            localhost      0/0      Direct     8m 20s
127.0.0.1/32       127.0.0.1       localhost      0/0      Direct     8m 20s
192.168.1/24       192.168.1.1     LAN0           0/0      Direct     2m 14s
192.168.1.1/32     192.168.1.1     LAN0           0/0      Direct     2m 14s
192.168.2/24       192.168.2.1     LAN1           0/0      Direct     2m  8s
192.168.2.1/32     192.168.2.1     LAN1           0/0      Direct     2m  8s
>
```

3.5 More Details About Operation

For the details about the operation, see the manuals listed in the Table 3-1 below.

Table 3-1 Details About Other Settings

Item	See Manual	See Section in Manual
Startup/restart of the GR2000-B	*GR2000 Operations Guide*	Startup of the operation
Configuration	*GR2000 Configuration Guide*	• Setting examples related to the IP routing protocols • Setting examples related to the IPv6 routing protocols
Setting for network interfaces	*GR2000 Configuration Guide*	• Setting examples related to the network interfaces • Setting examples related to the IPv6 network interfaces
Operation of the GR2000-B	*GR2000 Operations Guide*	Startup of the operation
Operation of a operative terminal	*GR2000 Operations Guide*	Operation overview for an operative terminal

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Chapter 4
Troubleshooting

This chapter explains the troubleshooting required for resolving the troubles related to the setup of the GR2000-B and it's basic operations.

4.1 Troubleshooting for Operations Introduced in this Guide

This section explains about the troubleshooting required for the case where you have a device malfunctioning or communication problems.

Table 4-1 Types of Trouble and Corrective Action

Type of Trouble		Corrective Action
The Router does not start up.	It can not be powered.	Check if the power cable is correctly inserted or the power switch is switched to ON (1).
	It stops running while keeping "STATUS" lighted in red.	There is a malfunction within the router. See the Regarding the troubles in the device, see the *GR2000 Operations Guide* for details.
The console is not functioning.	Nothing is shown on the window of the hyper terminal.	Check to see if the cable is correctly connected. Make sure you are using a RS-232C cross-cable for the setup terminal.
		Check if the communication parameters for the software of the terminal are correctly set. Regarding the communication parameters, see Table 2-1, “Specifications Required for Setup Terminals,” on page 2-11.
The router stops running while showing "20" for the "STATUS CODE".	If a memory card is not installed into the device.	Turn off power to the router and install a memory card according to the instructions of section 2.7, “Installing a Memory Card,” on page 2-8, then turn on the power.
	If a memory card is installed into the device.	There is the possibility that software is not loaded on a memory card. Install software according to the instructions of the *GR2000 Applications Guide*.
Communication using built-in Ethernet is not working.		Check if the cable is correctly connected. For the details about the cables to be used , see the Chapter 3 "Preparing Iinterface Cables and the Terminal” of the *GR2000-B Installation Guide*.
		Check if the "LINE" information is correctly set. For the details, see the section "Configuration setting" of the chapter 4 in this manual.
		Check if the routing protocol is set. For the details, see section 3.3, “Setting the Configuration,” on page 3-3 of this manual.
		Check if the IP address of the device connected to the GR2000-B is set correctly.

4.2 More Details About Troubleshooting

See the manuals listed in the Table 4-2 for detailed troubleshooting.

Table 4-2 Troubleshooting and Reference manuals

Item	Reference manuals	Reference sections
Trouble of every kind	*GR2000 Operations Guide*	Troubleshooting
Details for the operation log		Log messages

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